

Application No.: 10/775,522
Filing Date: February 10, 2004

REMARKS

Claims 1-11 and 38-43 were pending prior to this Response. In this Response, Claims 39, 40, and 42 are withdrawn and Claim 1 has been amended. Claims 1-11, 38, 41, and 43 remain pending and are at issue in the present Response.

In the Office Action dated October 7, 2008, Claims 1-3, 5, and 8-11 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,300,175 issued to Gardner et al. ("*Gardner*"); Claims 1-3, 5, and 8-11 were rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent Publication No. 2004/0094095 to Huang et al. ("*Huang*"); Claims 6 and 7 were rejected under 35 U.S.C. §103(a) as being unpatentable over *Gardner* or Huang in view of U.S. Patent Publication No. 2003/0075109 to Arai ("*Arai*"); and Claim 4 was rejected under 35 U.S.C. §103(a) as being unpatentable over *Gardner* or *Huang*.

Election/Restriction Requirement

The Examiner has maintained, and made final, the election/restriction requirement dated January 22, 2008 and in the notice of non-response dated May 16, 2008. In the present Office Action dated October 7, 2008, the Examiner has rejected Applicants' assertion that Claims 1-11, 38, 41, and 43 read on the elected Species I. Applicants respectfully request reconsideration of Applicants' identification of Claims 1-11, 38, 41, and 43 as encompassing the invention illustrated in FIGS. 1B and 1C of the original application as filed.

In the Election/Restriction Requirement mailed January 22, 2008, the paper states that "This application contains claims directed to the following distinct species: **Species I Figs. 1B, 1C and Species II 1D, 4B**" (emphasis added). The paper further states that "Applicant is advised that the reply to this requirement to be complete must include (i) an election of a species or invention to be examined even though the requirement be traversed (37 CFR 1.143) and (ii) identification of the claims encompassing the elected invention."

As such, Applicants assert that they have fully complied with the election requirements. In particular, in the "Response to Election of Species Requirement" submitted by Applicants on June 30, 2008, the Applicants clearly satisfied the first step required to provide a complete reply by electing Species I (which the Examiner indicated was directed to Figs. 1B and 1C). Further, Applicants also clearly identified Claims 1-11, 38, 41, and 43 as the claims that encompass the

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invention of Species I (Figs. 1B and 1C). In short, Applicants reiterate that each of Claims 1-11, 38, 41, and 43 encompasses the invention illustrated in FIGS. 1B and 1C.

The Examiner has stated in the present Office Action that “recall that the examiner also stated that claims 1-11 are species I and claims 38-43 are species II.” However, the Examiner is confusing a claim restriction (having Applicants elect a particular set of claims identified by the examiner) with a species restriction (having Applicants identify the claims that encompass the elected species). Applicants have satisfied the requirements of the original restriction/election as set forth in the Election/Restriction Requirement dated January 22, 2008 and hereby request examination of the identified claims that encompass the elected species. Applicants will address each of the rejections set forth in the present application as if they applied to each of the claims identified by Applicants in the previous election.

Amendments to the Claims

Claim 1 has been amended to recite “the substrate loaded on the first load platform” to properly recognized prior antecedent basis for the limitation.

35 U.S.C. §102(b) Rejection of Claims 1-3, 5, and 8-11 over Gardner

Claims 1-3, 5, and 8-11 were rejected under 35 U.S.C. §102(b) as being anticipated by *Gardner*. Applicants respectfully traverse this rejection. As explained above with respect to Applicants’ election, independent Claim 38 will also be discussed relative to this rejection.

Independent Claims 1 and 38 require the limitation of a “reaction chamber.” However, *Gardner* fails to teach a reaction chamber. Instead, *Gardner* teaches a bonding apparatus (10, 60) for bonding one wafer to another wafer. More particularly, *Gardner* states that “the present invention provides a method for bonding one wafer to another wafer” (*Gardner*, Col. 4, lines 16-17). The bonding apparatus of *Gardner* is substantially different than the reaction chamber recited in Claims 1 and 38 of the present application. Accordingly, Applicants assert that *Gardner* fails to teach at least one element of independent Claims 1 and 38 of the present application.

Further, independent Claim 1 also recites “the first load platform..., thereby permitting a process gas to contact both the frontside and backside of the substrate loaded on the first load

platform.” Gardner neither teaches nor contemplates contacting either side of a wafer with a process gas within the pressure vessel (48). Instead, Gardner is configured to bond two wafers together such that no process gases for fabricating an integrated device are needed (such as deposition gases or cleaning gases). Because Gardner teaches an apparatus for bonding two wafers together, the first load platform is clearly not configured to permit a process gas to contact the frontside and backside of the substrate loaded onto the first load platform. Accordingly, Applicants assert that Gardner fails to teach at least another element of independent Claim 1 of the present application.

Additionally, independent Claim 1 recites “the first load platform is fixed relative to the second load platform.” However, Gardner teaches that the submount support (30) upon which the first wafer is supported is vertically positionable relative to the wafer mount (21) upon which the second wafer is supported. Gardner states that “[c]ap screws 15 serve to secure submount support 30 to chuck 12 and, in combination with set screws 18, provide a desired vertical spacing between flexible projection 32 and wafer mount 21. Cap screws 15 are tightened after the vertical positioning of submount support 30 is adjusted using set screws 18” (emphasis added) (Gardner, Col. 3, lines 16-21). Thus, Gardner teaches away from a first load platform being fixed relative to the second load platform, as recited in Claim 1 of the present application. Applicants therefore assert that Gardner fails to teach at least another element of independent Claim 1 of the present application.

Claims 2-11 are dependent claims that depend from independent Claim 1 of the present application and include all of the limitations thereof. Claims 41 and 43 are dependent claims that depend from independent Claim 38 of the present application and include all of the limitations thereof. The allowability of Claims 2-11, 41, and 43 flows from the allowability of the independent claim from which they depend. Moreover, Claims 2-11, 41, and 43 include additional combinations of features that further patentably distinguish these claims from Gardner. Therefore, Applicants respectfully request the rejection of Claims 1-3, 5, and 8-11 under 35 U.S.C. §102(b) as being anticipated by *Gardner* to be withdrawn for the reasons provided above. Applicants also assert that Claims 38, 41, and 43 are also patentable over Gardner for the reasons provided above.

35 U.S.C. §102(e) Rejection of Claims 1-3, 5, and 8-11 over Huang

Claims 1-3, 5, and 8-11 were rejected under 35 U.S.C. §102(e) as being anticipated by *Huang*. Applicants respectfully traverse this rejection. As explained above with respect to Applicants' election, independent Claim 38 will also be discussed relative to this rejection.

Independent Claim 1 recites "each of the first and second load platforms is dimensioned and configured to directly support the substrate," and independent Claim 38 recites "a first means for directly supporting the substrate during processing; and a second means for directly supporting the substrate during processing." Huang fails to teach a first and second load platform or a first and second means for directly supporting the substrate. Instead, Huang teaches only a single platform or support configured to support a substrate. Applicants recognize that the substrate holder (48) disclosed in Huang teaches a first load platform or means for supporting a substrate. However, Huang does not teach a second load platform or a second means for supporting a substrate. Contrary to the Examiner's assertion, the substrate heater (66) taught in Huang is not configured to support or even contact the substrate. In particular, Huang states that "in application of the substrate holder assembly 40, the substrate 64 is initially supported on the annular substrate support shoulder 55 of the substrate holder 48, above the substrate heater 66" (emphasis added) (Huang, paragraph 30). There is no other teaching in Huang to indicate that at any time is there contact between the substrate (64) and the substrate heater (66), wherein the substrate heater (66) would in any way be directly supporting the substrate (64). Accordingly, Applicants assert that Huang fails to teach first and second load platforms or first and second means for directly supporting the substrate during processing. Thus, Applicants assert that Huang fails to teach at least one element of independent Claims 1 and 38 of the present application.

Claims 2-11 are dependent claims that depend from independent Claim 1 of the present application and include all of the limitations thereof. Claims 41 and 43 are dependent claims that depend from independent Claim 38 of the present application and include all of the limitations thereof. The allowability of Claims 2-11, 41, and 43 flows from the allowability of the independent claim from which they depend. Moreover, Claims 2-11, 41, and 43 include additional combinations of features that further patentably distinguish these claims from Huang. Therefore, Applicants respectfully request the rejection of Claims 1-3, 5, and 8-11 under 35

U.S.C. §102(b) as being anticipated by *Huang* to be withdrawn for the reasons provided above. Applicants also assert that Claims 38, 41, and 43 are also patentable over *Huang* for the reasons provided above.

35 U.S.C. §103(a) Rejection of Claims 6 and 7 over *Gardner* or *Huang* in view of *Arai*

Claims 6 and 7 were rejected under 35 U.S.C. §103(a) as being unpatentable over *Gardner* or *Huang* in view of *Arai*. Applicants respectfully traverse this rejection. As explained above with respect to Applicants' election, independent Claim 38 will also be discussed relative to this rejection.

Combination of *Gardner* and *Arai*

As explained above, *Gardner* fails to teach at least: (1) a "reaction chamber," (2) "the first load platform..., thereby permitting a process gas to contact both the frontside and backside of the substrate loaded on the first load platform," and (3) "the first load platform is fixed relative to the second load platform" of Claim 1 of the present application.

Applicants recognize that *Arai* teaches a reaction chamber, but Applicants assert that it would not have been obvious to one skilled in the art to combine the teachings of *Arai* with the teachings of *Gardner* to satisfy the reaction chamber limitation of Claim 1. *Gardner* is directed to bonding two wafers together without any further processing of an integrated circuit, whereas *Arai* is configured to process a substrate within a reaction chamber to produce vapor phase growth thereon. The reaction chamber (11) of *Arai* is configured to allow for safe processing of a substrate utilizing reactant gases flowing therethrough to produce chemical reactions within the reaction chamber. The pressure vessel (48) of *Gardner* is configured to withstand the reduced pressures generated within the bonding apparatus to ensure proper bonding between wafers. Col. 4, lines 48-51. The processes performed within *Gardner*'s pressure vessel (48) and *Arai*'s reaction chamber (11) are substantially different, such that it would not have been obvious to one skilled in the art to modify the teachings of *Gardner* by replacing the pressure vessel (48) with the reaction chamber (11) taught in *Arai* to teach the reaction chamber limitation of Claim 1 of the present application. Accordingly, Applicants respectfully assert that it would not have been obvious to one skilled in the art to combine the teachings of *Gardner* and *Arai*; as such,

Applicants assert that the combination of Gardner and Arai fails to teach at least one element of Claim 1 of the present application.

Additionally, Arai also fails to teach a load platform that permits a process gas to contact both the frontside and backside of the substrate loaded on the load platform. As illustrated in FIGS. 1-2 of Arai, the wafer (20) is first loaded onto lift pins (13), and then the susceptor (12) is raised until the wafer (20) is supported within the pocket portion (12a) of the susceptor (12). Arai fails to teach that the bottom surface (12c) is configured to allow a process gas to contact the bottom surface of the substrate. Thus, both Gardner and Arai fail to teach a load platform that allows a process gas contact both the frontside and backside of the substrate loaded on the load platform, as recited in Claim 1 of the present application. Because both Gardner and Arai fail to teach this element, the combination of the teachings of Gardner and Arai also fails to teach this element.

Applicants further assert that it would not have been obvious to combine the teachings of Arai with Gardner to satisfy the limitation requiring a first load platform that permits a process gas to contact both the frontside and backside of the substrate loaded on the platform. Although Applicants recognize that submount support (30) taught in Gardner allows both the frontside and backside surfaces of the wafer (40) to be exposed within the pressure vessel (48), it would not have been obvious to permit the frontside and backside of the substrate to be exposed to a process gas. The pressure vessel (48) of Gardner is configured to bond two wafers together – and not configured to perform fabrication of an integrated circuit device on the wafer within the pressure vessel. It would not have been obvious to one skilled in the art to combine the processing capabilities – including the introduction and removal of process gases and byproducts – taught in Arai with the pressure vessel (48) of Gardner because the processes performed within the two vessels is substantially different, and such a modification would change the principle operation of the pressure vessel (48) of Gardner and render the pressure vessel inoperable for its intended purpose. It would likewise not be obvious to one skilled in the art to modify the susceptor (12) of Arai to permit a process gas to contact both the frontside and backside surfaces of the substrate. If the susceptor (12) of Arai were modified to allow process gases to contact the backside surface of the substrate supported thereon, the principle operation of the susceptor would be impermissibly changed. The susceptor in the configuration shown in Arai is designed

to absorb and transfer heat produced by the lamps (16) to the backside of the substrate. Thus, if the susceptor (12) of Arai is modified to permit a process gas to contact the backside of the substrate, the modified susceptor would be inoperable for its intended purpose – to absorb and transmit heat from the lamps to the substrate. Accordingly, Applicants respectfully assert that it would not have been obvious to combine the teachings of Arai with Gardner to satisfy the limitation requiring a first load platform that permits a process gas to contact both the frontside and backside of the substrate loaded on the platform.

Finally, Arai fails to teach a first load platform being fixed relative to a second load platform, as recited in Claim 1 of the present application. Instead, Arai teaches only a single load platform – the susceptor (12). Thus, Arai did not make it obvious to one skilled in the art to modify either of the load platforms taught in Gardner such that the first load platform is fixed relative to the second load platform because Arai teaches only one substrate load platform. Even if one skilled in the art would have combined the teachings of Arai and Gardner, Arai still fails to cure the deficiencies of Gardner, and the combined teachings fail to satisfy every element of Claim 1 of the present application.

Claims 6 and 7 are dependent claims that depend from independent Claim 1 of the present application and include all of the limitations thereof. Therefore, Applicants respectfully request the rejection of Claims 6 and 7 under 35 U.S.C. §103(a) as being unpatentable over *Gardner* in view of *Arai* to be withdrawn for at least the reasons provided above.

Combination of Huang and Arai

Claim 1 of the present application recites a first and a second load platform. As explained above, Huang fails to teach these limitations. Arai likewise fails to teach these elements. Instead, Arai teaches a single load platform – the susceptor (12). Hence, Huang and Arai both teach only one load platform. Thus, it would not have been obvious in view of Arai to modify the teachings of Huang to add a second load platform to support a substrate. Even if one skilled in the art would have combined the teachings of Arai and Huang, it would not be obvious to one skilled in the art to add a second load platform. Arai fails to cure the deficiencies of Huang, and any combination of Arai with Huang likewise fails to teach a first and a second load platform, as recited in Claim 1 of the present application.

Accordingly, Applicants assert that it would not have been obvious to one skilled in the art to combine the teachings of Huang and Arai, and further, such a combination of the teachings of Huang and Arai fails to satisfy each of the limitations of Claim 1 of the present application.

Claims 6 and 7 are dependent claims that depend from independent Claim 1 of the present application and include all of the limitations thereof. Therefore, Applicants respectfully request the rejection of Claims 6 and 7 under 35 U.S.C. §103(a) as being unpatentable over *Huang* in view of *Arai* to be withdrawn for at least the reasons provided above.

35 U.S.C. §103(a) Rejection of Claim 4 over *Gardner* or *Huang*

Claim 4 was rejected under 35 U.S.C. §103(a) as being unpatentable over *Gardner* or *Huang*. Applicants respectfully traverse this rejection.

As explained above, *Gardner* fails to teach at least: (1) a “reaction chamber,” (2) “the first load platform..., thereby permitting a process gas to contact both the frontside and backside of the substrate loaded on the first load platform,” and (3) “the first load platform is fixed relative to the second load platform” of Claim 1 of the present application. It would not have been obvious to modify the pressure vessel (48) of *Gardner* into a reaction chamber for the fabrication of an integrated device. The pressure vessel (48) is designed for the purpose of bonding two wafers to each other, and one skilled in the art would not have re-designed the pressure vessel (48) so that it is capable of performing integrated circuit fabrication. Such a modification would change the principle operation of the pressure vessel (48). Accordingly, *Gardner* fails to teach a reaction chamber, and it would also not have been obvious to one skilled in the art to modify the teachings of *Gardner* to use a reaction chamber for fabricating integrated circuits for the purpose of bonding two substrates together.

The pressure vessel (48) of *Gardner* is configured to bond two wafers to each other. There are no gases introduced into the pressure vessel (48) during this process. In fact, gas within the vessel is removed to reduce the pressure as a means for causing one of the wafers to bend and contact the other wafer. Because the invention taught in *Gardner* is not for fabricating integrated circuits, it would not have been obvious to one skilled in the art to modify either the structure or the process taught in *Gardner* to include introducing process gases into the pressure vessel (48). Accordingly, *Gardner* also fails to teach a first load platform that permits a process

gas to contact both the frontside and backside of the substrate, and it would also not have been obvious to one skilled in the art to modify the teachings of Gardner to provide a first load platform that permits a process gas to contact both the frontside and backside of the substrate.

Additionally, the first submount (30) taught in Gardner is movable/adjustable relative to the second submount (20) to properly position a first wafer relative to a second wafer within the pressure vessel (48). If the first submount (30) were not adjustable relative to the second submount (20), the first wafer may be positioned at a location too far away from the second wafer such that bonding therebetween could not be accomplished according to the structure disclosed in Gardner. Thus, it would not have been obvious to one skilled in the art to fix the first submount (30) relative to the second submount (20). Accordingly, Gardner fails to teach a first load platform that is fixed relative to a second load platform, and it would also not have been obvious to one skilled in the art to modify the teachings of Gardner to provide a first loading platform that is fixed relative to a second loading platform, as recited in Claim 1 of the present application.

Claim 4 is a dependent claim that depends from independent Claim 1 of the present application and includes all of the limitations thereof. Therefore, Applicants respectfully request the rejection of Claim 4 under 35 U.S.C. §103(a) as being unpatentable over *Gardner* to be withdrawn for at least the reasons provided above.

As explained above, Claim 1 of the present application recites "each of the first and second load platforms is dimensioned and configured to directly support the substrate." Huang fails to teach a first and a second load platform. The reaction chamber taught in Huang is configured to process only a single substrate at a time. It would not have been obvious to one skilled in the art to modify the teachings of Huang to add a second load platform. Accordingly, Huang fails to teach a first and a second load platform, and it would also not have been obvious to one skilled in the art to modify the teachings of Huang to provide both a first and a second load platform within the reaction chamber, as recited in Claim 1 of the present application.

Claim 4 is a dependent claim that depends from independent Claim 1 of the present application and includes all of the limitations thereof. Therefore, Applicants respectfully request the rejection of Claim 4 under 35 U.S.C. §103(a) as being unpatentable over *Huang* to be withdrawn for at least the reasons provided above.

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No Disclaimers or Disavowals

Although the present communication includes characterizations of claim scope and referenced art, Applicants are not conceding in this application that previously pending claims are not patentable over the cited references. Rather, any characterizations are being made to facilitate expeditious prosecution of this application. Applicants reserve the right to pursue at a later date any previously pending or other broader or narrower claims that capture any subject matter supported by the present disclosure, including subject matter found to be specifically disclaimed herein or by any prior prosecution. Accordingly, reviewers of this or any parent, child or related prosecution history shall not reasonably infer that Applicants have made any disclaimers or disavowals of any subject matter supported by the present application.

SUMMARY

Applicants assert that pending Claims 1-11, 38, 41, and 43 are in condition for allowance. Applicants respectfully request the Examiner to grant allowance of the present application. The Examiner is invited to contact the undersigned attorney for the Applicants via telephone if such communication would expedite the allowance of this application.

While Applicants believe that no additional fees are due in connection with this application, Applicants respectfully request that Deposit Account No. 11-1410 be charged for any fees deemed owed during the pendency of this application, excluding the issue fee. In addition, please credit any overpayment to the same account.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

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By: Sanjivpal S. Gill
Sanjivpal S. Gill
Registration No. 42,578
Attorney of Record
Customer No. 68852
(415) 954-4114